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ed, inasmuch as it was put up and forwarded by Koch himself. It shows all the peculiarities of shape described by him, and most certainly bears out the assertion that it possesses distinguishing characteristics from other bacteria. In form and arrangement, it differs markedly from any other organism with which we are acquainted, either those found in the intestines or elsewhere.

### SCIENCE IN MANCHESTER.

*A centenary of science in Manchester.* (In a series of notes.) By R. ANGUS SMITH, Ph.D., LL.D. London, *Taylor & Francis*. 475 p. 8°.

THE progress of literature and science in Manchester, Eng., is full of interest to Americans. It is not only that the city is full of life and vigor, and that its relations to the United States are very close, but there is a sort of western freshness in all its undertakings. Owens college is not yet forty years old; the Victoria university is more recent than Johns Hopkins; the Literary and philosophical society of Manchester is younger by several years than the American academy and the American philosophical society; and the Free public library is the junior of the Astor library in New York. Manchester has grown during this century more rapidly than Baltimore, and its wealth has increased at a rate which is still more remarkable. Under these circumstances, we have examined with some curiosity the volume prepared for the hundredth year of the Literary and philosophical society of Manchester, 1881.

Among the many honorable names commemorated in it, two are pre-eminent,—Dalton and Joule. The former established the science of chemistry on the basis of the atom: the latter ascertained the mechanical equivalent of heat. Referring to these great discoverers, Dr. Smith expresses his belief that there has been “a law in the recesses of humanity which has caused the influence of the community to concentrate itself, first into the Society, and then, through particular members, into the theory of chemistry, equivalents of atoms, and their connection with mechanical force,—the knowledge of which must influence mankind forever.” Dalton’s development of the atomic theory was preceded by other noteworthy contributions to science,—his discovery of color-blindness, his epoch-marking essays in meteorology, and his elaborate inquiry on the force of vapor; to all of which brief reference is here made.

Joule was a pupil of Dalton; “a follower,”

says Smith, “worthy of the prophet; . . . a pupil who has become the master of many learners.” The relations of these two men are thus described. “The idea of units of *measure* in Dalton’s mind developed itself gradually into the idea of units of *force* in the mind of Joule. . . . To say that the two are the most successful descendants of the great thinkers who have grappled with the subject of atoms for three thousand years, is but to express a simple fact; and to assert that Dalton and Joule have made the great leading discoveries on the subject is simply to follow history. From one we learn the order in which the ultimate particles of bodies move: from the other we learn the force and relation of their movements in those great phenomena, heat, electricity, and mechanical force.”

There are other stars in the Manchester firmament. Among them are William Fairbairn, builder of the tubular bridge at Menai, a man of ‘wonderful instinct’ as an engineer; and his more scientific coadjutor, Eaton Hodgkinson. Sir John Hawkshaw, Sir Henry Roscoe, and Professor Balfour Stewart are famous among recent members of the society. The laboratory of Dr. Edward Schunck is said to be the finest private laboratory in the country. The founder of the society, Dr. Thomas Percival, a physician of great repute, who had the skill to elicit the best co-operation of other men, is commemorated by Dr. Smith as one who foreshadowed some of Darwin’s views. His contemporary in the society, Charles White, Dr. John Ferriar and the three Henrys, also receive due notice; and so does Thomas Cooper, afterwards of Columbia, S.C., whose name has recently been brought to mind by allusions to it in the autobiography of Dr. Marion Sims.

The comments of Dr. Smith on the present state of the society are suggestive. First, he recognizes a disposition, on the part of the Manchester investigators, to send their papers to the Royal society of London. “It is useless to complain of this: it is a phase of national life, and it will probably grow stronger for a time, until this sub-centre becomes sufficiently brilliant to make men feel that it is an object of great ambition to become distinguished here.” The writer thinks that Manchester has allowed its forces to be too much scattered. Next he pleads for enlarged quarters. The members of the society are unwilling to leave the rooms where Dalton studied, which were his home from morning until evening for the greater part of his life; but more space is demanded. Third, he answers the

criticism that the society gives 'no lectures, no *soirées*, no displays.' Fourth, he argues that original researches should be encouraged in Manchester, and that this society should inspire and aid such work. This leads him to mention the good influence of Owens college and the Victoria university. He closes the chapter with the strong assertion, which few men of science will dispute, that if Manchester, and many cities and countries besides, were obliterated from the earth, the loss would be less than it would be if the world should lose the influence which came from Dalton's atomic theory and from Joule's law of the mechanical equivalent of heat.

#### INDIAN SIGN-LANGUAGE.

*The Indian sign-language*; with brief explanatory notes of the gestures taught deaf-mutes in our institutions for their instruction, and a description of some of the peculiar laws, customs, myths, superstitions, ways of living, code of peace, and war-signals of our aborigines. By W. P. CLARK, U.S.A. Philadelphia, *Hamersley*, 1885. 443 p. 8°.

THE study of the gesture-speech of our Indians began in 1801, when Mr. William Dunbar read a paper on the subject before the American philosophical society, which was published in their Transactions. Only quite within the last decade, however, has the subject received the careful attention which it merits. In 1880 there appeared, under the auspices of the Bureau of ethnology, three works, or rather portions of the same work, from the pen of Col. Garrick Mallery, U.S.A., entitled "A collection of gesture signs and signals of the North-American Indians, with some comparisons" (distributed only to collaborators, and therefore one of the bibliographic rarities of the government press); "Introduction to the study of sign-language among the North-American Indians;" and "Sign-language among North-American Indians compared with that among other peoples and deaf-mutes." This last, which was printed in the first report of the Bureau of ethnology, is amply illustrated, and may be considered the completion of Col. Mallery's investigations in this direction. It includes a history of gesture-language in both the old and new world, its study as a phase of evolution, its prevalence in America, its relations to philology, its connection with the origin of writing and the interpretation of pictographs, and the bearings it has upon theories of syntax and etymology.

These applications are striking and instructive in a high degree, and vindicate the eminently important place which the philosophic study of gesture-speech must hereafter occupy in archeologic research. An excellent illustration of it is given by Dr. W. J. Hoffman, in an article on American pictography in the Transactions of the Anthropological society of Washington (vol. ii. 1883), where by its aid he translates in the most satisfactory manner a petroglyph from California, and an Innuït carving on ivory. Such a demonstration of the significant character of these primitive rock inscriptions and carvings was the more timely, since the distinguished ethnologist, Dr. Richard Andree, in his '*Ethnographische parallelen und vergleiche*,' has condemned pretty much all these relics as the idle and meaningless amusements of savages.

Capt. Clark's work is a welcome addition to our knowledge of the subject. He speaks from long personal observation and a practical familiarity with this mode of communicating ideas. His studies began in 1876, and were continued for years, mainly within the limits of the plains or prairie tribes. As in Mallery's treatise, the words are arranged alphabetically, the signs following them, thus facilitating comparison. An advantage in Capt. Clark's presentation is, that he adds the mental conception or picture which the native forms to himself of the object or idea to be represented, thus furnishing a clearer meaning to the sign, and also enlightening the reader as to the psychology of the aboriginal thinker. His definitions are by no means confined to explaining the sign-language. He fully redeems the promise on his titlepage to describe the laws, customs, myths, and peculiarities of the tribes he names. These facts are all fresh, derived from original observation, and add a great deal to the available ethnological information of the prairie Indians.

Such material must, however, be used with caution. When (p. 10) the author infers from the myths of the Indians that there was a time, referred to in these narratives, in which the natives did not know the use of the bow and arrow, he attributes to these stories an antiquity which they by no means possess. The stemmed and barbed arrow-head was in use when the loess of the now long since dried-up Nebraska lakes was in process of formation, almost a geologic cycle ago.

In an appendix the author describes a number of signals with a blanket, a pony, or a mirror, and adds the explanation of various geographical names. It is a peculiarity that